

Gonocarpus hirtus Orchard (Haloragaceae), new from southeastern Queensland and northeastern New South Wales

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Summary

Orchard, A.E. (2004). *Gonocarpus hirtus* Orchard (Haloragaceae), new from southeastern Queensland and northeastern New South Wales. *Austrobaileya* 6 (4): 961–965. A new species from the ranges southwest of Brisbane, and the northeastern highlands of New South Wales, is described and illustrated. *G. hirtus*, found in dry sclerophyll forest, belongs to a complex of weak scrambling subshrubs found throughout the Great Dividing Range, from Victoria to Queensland, and is most closely allied to *G. longifolius* and *G. effusus*.

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Introduction

The genus *Gonocarpus* comprises 42 species, widespread in Australia and New Zealand, with a few species also extending to New Guinea, Indonesia, the Philippines, Japan and SE Asia. There are 37 species in Australia, the majority in dry to damp sclerophyll forest, but with some species found in almost all habitats. The genus was revised by Orchard (1975), with additional species described in Orchard (1977, 1986). A summary of the then-known Australian species was published by Orchard (1990).

With their often sparse, scrambling habit and inconspicuous flowers, *Gonocarpus* species are frequently overlooked by all but the most thorough collectors, and are probably under-represented in most collections. Despite this, sporadic collecting has led to a steady increase in numbers of new taxa described since the last revision, particularly from the ranges of the eastern seaboard. In the dry to damp sclerophyll forests of the eastern ranges of Victoria, New South Wales and Queensland the understorey often contains one or more species of *Gonocarpus*. In the driest areas, particularly on rocky outcrops, the most common species is the alternate-leaved *G. elatus*. In slightly damper areas, subject to enhanced runoff or higher rainfall *G. elatus* is replaced by the most common *Gonocarpus* of all, *G. tetragynus*. In even damper situations the scrambling *G. humilis* or the more erect shrubby *G. teucroides* replaces *G. tetragynus*, to be replaced in turn by members of the *G. longifolius* complex. *G. tetragynus*,

G. humilis, *G. teucroides*, and members of the *G. longifolius* complex (*G. longifolius*, *oreophilus*, *G. effusus*) all have opposite leaves, which usually become alternate above as they merge into the bracts of the inflorescence.

Gonocarpus elatus differs from all others below in having uniformly alternate leaves. Its fruit is irregularly rugose with about 4 rows of rounded tubercles, while that of the opposite-leaved species is uniformly 8-ribbed with 3–4 oblique calluses between the pairs of ribs, often sloping in alternate directions in each vertical row, forming a chevron pattern.

Gonocarpus tetragynus is a small subshrub, rarely exceeding 30 cm tall, and is easily recognisable by its lanceolate leaves with a distinctive indumentum of evenly distributed, closely appressed stiff hyaline hairs. The remaining species are usually much larger plants.

G. longifolius is a subshrub 35 to 100 cm tall, found mainly in shrub communities on sandstone soils from sealevel to about 600 m, mainly in New South Wales, from the Blue Mountains to New England, and extending just over the border into SE Queensland. See Bell (2001) for a discussion of recent range extensions. It is characterised by its long, soft, spreading hairs on stems and sometimes on the leaves, and by its linear-oblong leaves, 1.3–3.2 mm long, with 20–30 small cuspidate teeth.

G. humilis is usually a much weaker, scrambling plant, with relatively long soft hairs on the stems and leaves, more or less ovate

leaves, and differs from other species of the complex in having very short (to 1.5 mm) petals and anthers, the latter reduced to 4 instead of the usual 8. The missing whorl of stamens may be replaced by small staminodes. *G. humilis* seems to prefer damp or swampy areas within sclerophyll forest, from sealevel to about 1200 m.

G. teucroides is a more robust species than *G. humilis*, with more hispid hairs, usually seated on swollen multicellular bases. It has the usual 8 stamens, and can be distinguished from all other members of the complex by its large, green, fleshy, lanceolate to narrowly ovate bracteoles which often more or less conceal the ovary of the flower. The bracteoles of other members of the complex are usually brown, narrow, and much smaller than the ovary. *G. teucroides* is usually found in the understorey of dry sclerophyll forest, from sealevel to about 1200 m, but has also been recorded on the margins of rainforest and in subalpine communities.

G. oreophilus has a similar distribution to *G. longifolius*, but is found in rainforest or wet sclerophyll forest at 300–1500 m. It is distinguished from *G. longifolius* by its larger (1.0–3.5 cm) ovate to oblong leaves with 15–30 rounded teeth, and by an indumentum on the stems and leaves which is fine, very short, and almost velvety.

G. effusus is a further member of the complex, confined to the Glasshouse Mountains of SE Queensland at around 180 m, where it occurs in open, rocky situations. It has very small (4–5 mm long) ovate leaves with thickened margins and only 4–6 minute teeth.

At the time of preparation of my revision of the genus (Orchard, 1975) an anomalous collection from Mt Maroon, SW of Beaudesert, Queensland, was known, but its status was unclear. It was tentatively identified as a possible hybrid between *G. longifolius* and *G. teucroides*, or a possible new species. Additional material has now been collected from nearby Mt Moon, Mt Gillies and Mt Greville, and from near Moonbi Gap in New South Wales, and it now seems clear that these collections represent another species of restricted distribution within the *G. longifolius* complex. The new species, described below, has the long silky stem indumentum of *G. longifolius*, but differs in its

narrowly ovate leaves with only about 10, much coarser, teeth. The hairs on the upper surface of the leaves of *G. hirtus* are silky, spreading and dense. In *G. longifolius* in the southern part of its range the leaf hairs are relatively sparse and short, and usually more or less appressed. In the northern part of its range they are longer and more erect, but never quite as exuberant as in *G. hirtus*. The dentition of the leaves is also clinal, with southern *G. longifolius* having up to 30 small teeth per leaf, but the numbers of teeth decrease and their size increases as one moves north. However, despite these intergradations, *G. hirtus* is distinguishable by its narrowly ovate leaf shape, teeth rarely exceeding 10 per leaf, teeth about 1 mm long and coarse, and dense softly hirsute upper leaf indumentum. *G. longifolius* has narrowly oblong leaves, with (12–) 20–30 small teeth to 0.5 mm long, and subglabrous to appressed hairs on the upper leaf surface. The only other species which might be confused with *G. hirtus* is *G. humilis*, which has very short petals, and stamens reduced to 4 (usually plus 4 staminodes).

Taxonomy

Gonocarpus hirtus Orchard, **sp. nov.** Species *G. longifolium* simulans, sed foliis ovatis, (8–) 10–14 mm longis, 5–8 mm latis, dentibus usque 10 grossis et 1 mm longis, et pilis foliorum patentibus hirsutis usque 1 mm longis, differt. **Typus** (here designated): Queensland. MORETON DISTRICT. *I.R. Telford* 11987 & *J. Nightingale*, 15 Nov. 1993, Mount Greville, southeast ridge. Holotypus: CBG9313900. Isotypi (n.v.): BRI, NSW, MEL.

Weak scrambling subshrub 25–40 cm or more tall. Stems mainly annual from a persistent woody rootstock, c. 1.0–1.5 mm diam., round in section (not ribbed), reddish brown, covered with dense soft spreading (slightly antrorsely curved) hairs. Hairs c. 1 mm long, hyaline, of about 5 cells, uniseriate, seated on a very slightly swollen basal cell. Leaves opposite, becoming alternate near inflorescence, on petioles 1.5–3 mm long. Lamina dark green, narrowly ovate, (8–) 10–14 mm long, 5–8 mm wide, gradually becoming smaller towards tips

of branches, soft, coarsely serrate with about 5 cuspidate teeth c. 1 mm long on each margin; margin with distinct hyaline thickening; moderately semiappressed hirsute on both surfaces with hairs as for stem. Inflorescence of flowers borne singly in axils of upper leaves (=bracts). Bracteoles reddish brown, linear-lanceolate, 1 mm long, 0.25–0.3 mm wide, tapering gradually to acute tip, densely hirsute with hairs as for stems. Flowers 4-merous, on pedicels 0.7 mm long. Sepals purplish green, narrowly oblong, 0.7 mm long, 0.3 mm wide, blunt at tip, with prominent white callus at base; margins white-hyaline, slightly thickened. Petals reddish purple, paler at margins, 7 mm long, 1.5 mm keel to margin, strongly hooded, non-unguiculate (sessile), with moderately dense hairs (as for stem) on dorsal surface. Stamens 8; filaments 0.25 mm long; anthers reddish, linear, 2 mm long, non-apiculate. Styles 4, clavate, reddish-yellow fimbriate. Ovary silvery grey, ovoid, 1.0–1.3 mm long, 0.9 mm diam., 8-ribbed with c. 3 oblique calluses between each pair of ribs, with occasional hyaline scabrous hairs on calluses and/or ribs. Fruit as for ovary, silvery grey to pale reddish purple, 1.2–1.3 mm long, 1.0 mm diam.; sepals green, persistent. **Fig. 1.**

Specimens examined: Queensland: MORETON DISTRICT. A.R.Bean 6647, 2.x.1993, Mt Gillies, south of Rathdowney (BRI, CANB); P.I.Forster, A.R.Bean & L.H.Bird PIF6633, 14.iv.1990, Mount Moon, 5 km SW of Mount Alford township (BRI, CANB); I.R.Telford 3525, 4.x.1973, Mt Maroon, 36 km SW of Beaudesert (CANB). **New South Wales:** NORTHERN TABLELANDS: L.M.Copeland 3277, 22.xi.2001, Stony Batter Creek Nature Reserve, c. 60 km WNW of Armidale (CANB, NE, NSW). North West Slopes: J.R.Hosking 1382 & 1385,

10.xii.1996, ~1.5 km W of Moonbi Gap (CANB, MEL, NE, NSW, TARCH).

Distribution, habitat and ecology: Present collections suggest that in Queensland *G. hirtus* is confined to the Moreton District, in a small area of mountains ca 50 km southwest of Brisbane, where it is recorded from "eucalypt forest with *E. dura*, *E. tindaliae*, *E. acmenoides*, shallow soil, alt. 600m." (A.R.Bean 6647), "rhyolitic rock outcrops, with *Eucalyptus dura* and *Eucalyptus acmenoides*; alt. 600 m" (P.I.Forster et al., PIF6633), "dry sclerophyll forest on rocky slopes, alt. c. 700 m altitude" (I.R.Telford 3525), and "rocky ridge, SE aspect, skeletal soil on trachyte, shrub community, *Eucalyptus notabilis* (mallee habit), *Westringia sericea*, *Leptospermum* spp., alt. 350 m." (I.R.Telford 11987 & J.Nightingale). In New South Wales it is known from the North Western Slopes and Northern Tablelands regions in "shrubland on brown silt and sand over granite at 790 m." (J.R.Hosking 1382 & 1385) and "shallow sandy loam amongst boulders; layered woodland dominated by *Eucalyptus andrewsii* and *E. prava*; 920 m." (L.M.Copeland 3277). It flowers October–November, and fruit is present until April.

Key to related species

The following key is based on leads 10 to 15 in Orchard (1990), with the addition of *G. teucrioides* and *G. hirtus*. *G. chinensis* is included because it is a species of northern Queensland and the Northern Territory, but is not part of the complex under discussion.

1. Stamens 4, opposite sepals; staminodes 4 **G. humilis**
 Stamens 8, all functional 2
2. Subshrub usually 50–100 cm tall; main stems distinctly woody 3
 Perennial herb usually less than 35 cm tall; main stems herbaceous or
 only slightly woody 7
3. Bracts of inflorescence opposite, at least at base; bracteoles green, fleshy,
 concealing ovary; indumentum of young stems and leaves of stiff scabrous
 hairs 0.2–0.5 mm long, seated on swollen multicellular bases **G. teucrioides**
 Bracts of inflorescence all alternate; bracteoles red-brown, membranous,
 much smaller than ovary; indumentum of young stems and leaves long
 (to 1 mm) and soft, or if shorter and stiff, not seated on swollen
 multicellular bases 4

4. Leaves and young stems with dense indumentum of soft, spreading 2–5-celled hyaline hairs 0.3–1 mm long 5
 Leaves and young stems with sparse to dense indumentum of stiff, spreading 1–2-celled hyaline hairs 0.1–0.3 mm long 6
5. Leaves linear-oblong, (1.3–) 1.5–2.5 (–3.2) cm long, 0.3–0.6 cm wide, with (12–) 20–30 teeth to 0.5 mm long **G. longifolius**
 Leaves narrowly ovate, 0.8–1.4 cm long, 0.5–0.8 cm wide, with ca 10 teeth to 1 mm long **G. hirtus**
6. Indumentum dense, velvety; leaves ovate to oblong, 1.0–3.5 cm long **G. oreophilus**
 Indumentum sparse, scabrous; leaves ovate, 0.4–0.5 cm long **G. effusus**
7. Indumentum of young stems and leaves soft, spreading; leaves narrowly ovate .. **G. hirtus**
 Indumentum of young stems and leaves stiff, scabrous, appressed; leaves lanceolate to linear-lanceolate 8
8. Leaves lanceolate, widest near centre; leaves, bracts, bracteoles and sepals lacking prominent white thickened margins; indumentum of young stems and leaves moderately dense, even, appressed, of stiff, straight unicellular hairs 0.2–0.3 mm long **G. tetragynus**
 Leaves linear-lanceolate, widest towards base; leaves, bracts, bracteoles and sepals with prominent white thickened margins; indumentum of young stems and leaves sparse, appressed, scabrous, of curved 1–2 celled hairs 0.2–0.3 mm long **G. chinensis**

Etymology: The epithet 'hirtus' refers to the long soft spreading indumentum of the young stems and leaves, which this species shares with *G. longifolius*.

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References

- BELL, S.A.J. (2001). Notes on the distribution and conservation status of some restricted plant species from sandstone environments of the upper Hunter Valley, New South Wales. *Cunninghamia* 7: 77–88.
- ORCHARD, A.E. (1975). Taxonomic revisions in the family Haloragaceae. I The genera *Haloragis*, *Haloragodendron*, *Glischrocaryon*, *Meziella* and *Gonocarpus*. *Bull. Auckland Inst. Mus.* 10: 1–299.
- (1977). Taxonomic revisions in the family Haloragaceae. II Further notes on *Haloragis*, *Haloragodendron* and *Gonocarpus*. *Nuytsia* 2: 126–144.
- (1986). New taxa in *Gonocarpus* and *Haloragis* (Haloragaceae). *Nuytsia* 5: 327–339.
- (1990). Haloragaceae, pp.5–85, in A.S.George (ed.), *Flora of Australia* vol. 18, *Podostemaceae to Combretaceae*. AGPS, Canberra.

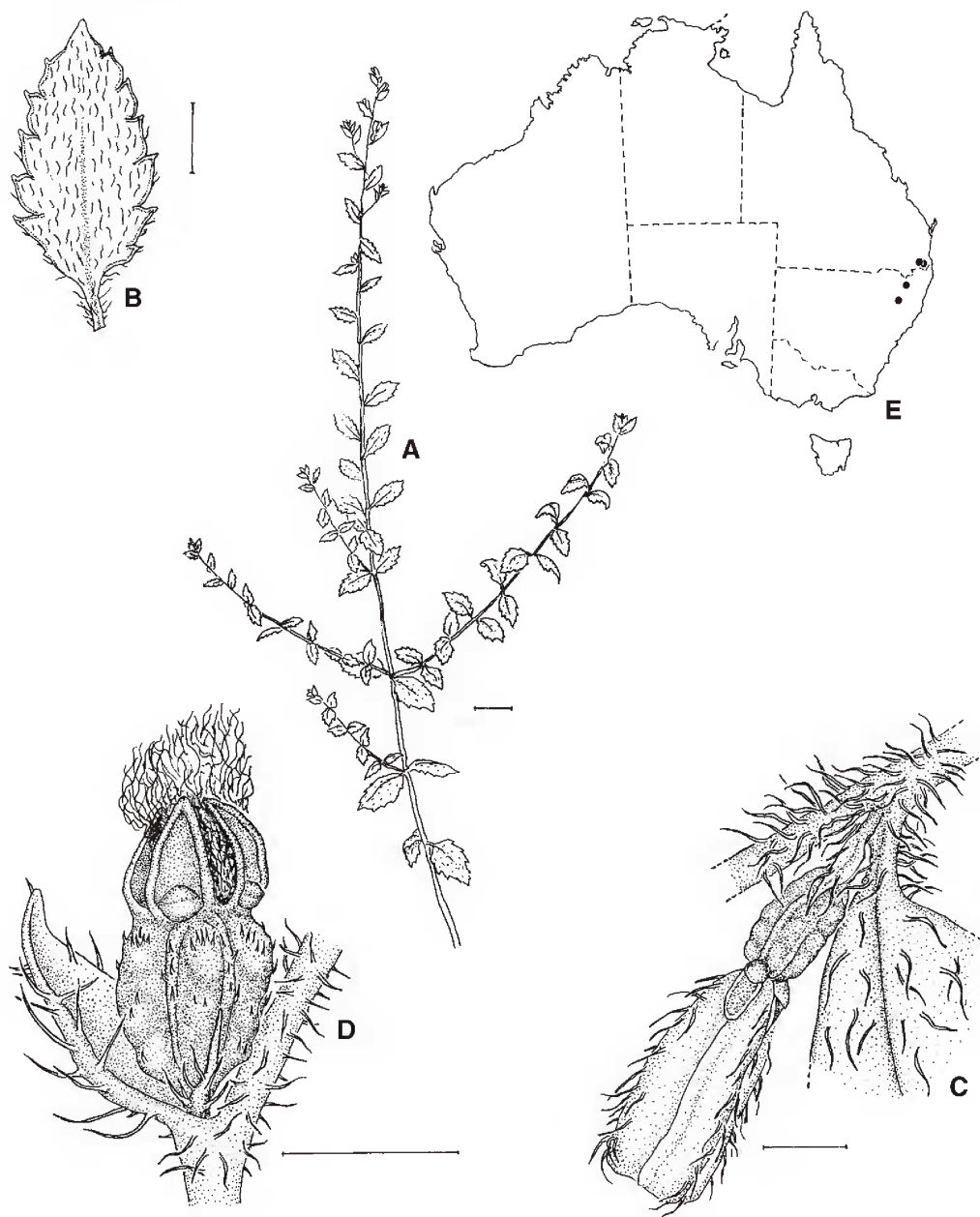


Fig. 1. *Gonocarpus hirtus*. A. Habit. B. Leaf. C. Flower in axil of bract. D. Fruit. E. Distribution. (A–C. Telford 3525; D. Forster, Bean & Bird PIF6633). Scales represent 1 cm (A), 5 mm (B), 1 mm (C, D).